THE CURRENT STATUS OF THE GENUS HYDROCYNUS IN LAKE KAINJI

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Abstract.
Over a period of a year, a study was carried out to determine the morphology of the Genus Hydrocynus which comprises carnivorous fishes known as Tiger fishes. Determination of the morphology was carried out using both quantitative (morphometric and meristic) characteristics and qualitative characters such as colour and shape of the fish. It was discovered that some of the species that were available in large numbers in the lake in past years have decreased in number. The paper looks into the possible reasons for the reduction of these commercially important species.

Introduction
The diversity of fish species in any water body is attributed to favourable conditions. Fish populations also respond to factors such as over fishing, pollution and eutrophication abundance in the aquatic environment (Welcomme, 1999). Today, numerous fish stocks and species have declined in abundance and composition since their historical peaks, and some have even gone extinct while others are being threatened, leading to urgent calls for more stringent management and the establishment of protected areas (Roberts, 2003).

High reliance on fishing, together with the depletion of large high value stocks, results in the exploitation of a great variety of species and habitats by diverse fishing methods and large concentrations of fishers (Welcomme, 2001).

When a pre-damming survey took place in rocky stretches of the cut-off channel of River Niger at Kainji in 1966 (Motwani and Kanwai, 1970) the composition of catches showed that the Characid group was most often recorded, followed by Mormyridae, Mochokidae and Schilbeidae. Sampling with a fleet of gill nets revealed that Hydrocynus forskalii and Hydrocynus brevis were among the species regularly and frequently sampled (Lelek, 1968).

According to Banks et al. (1965) and Motwani and Kanwai (1970), the Characidae formed an insignificant part of the fish population before the lake’s formation. However, within 18 months of the closure of the dam, the characid population had expanded to such an extent that the family comprised 14.6% by number of the total experimental gillnet catch for 1969 (Lelek, 1972) and was second only to the Citharinidae in terms of the contribution to the total weight of the catch.

By 1970, the Characidae had overtaken the Citharinidae to become the largest component of the gill net catches in terms of both number and weight (Lelek, 1972). This situation remained the same through 1970 to 1972. The greater part of the Characid catch from 1970 to 1972 was composed of two species, Hydrocynus forskalii (Cuvier) and Alestes baremose (Joannis) both of which were abundant in all parts of the lake. The reason for the success of Hydrocynus forskalii which is an entirely predatory species was associated with the abundance of clupeids on which the former feeds. Lelek (1972) observed that fish of the Characidae family were almost constantly increasing in number and weight and in the latest samples of 1971; they were the most important component of gill net catches.

By 1976, Blake (1976) reported that the commercial fishery of Lake Kainji was dependent on the very numerous characids, particularly Hydrocynus forskalii. The family Characidae is represented by three genera and fifteen species. Most species of this family are numerous and they make up an important part of the commercial catch. The genus Hydrocynus (or tiger fishers) are known to be strictly ichthyophagus. All the fish belonging to this genus appreciably look similar and only an attentive examination makes it possible to differentiate them. (Leveque, et al, 1990)
The objective of this study was to compile information on the morphological characteristics of the genus *Hydrocynus* and to distinguish between two species of the genus: *Hydrocynus vittatus* (*lineatus*) and *Hydrocynus forskalii* through the analysis of morphometric and meristic features and other peculiar characteristics that make field identification easier.

**Methodology**

**Fish sampling and analysis:** The fishes used in the study were obtained from Lake Kainji and the River Niger near Kainji Dam. Visits were made twice weekly from the month of April 2005 to April, 2006, Fish caught by fishers were examined physically to pick out samples of *Hydrocynus* species. The sample was later sorted by species using identification keys by Holden and Reed (1972) and Reed *et al.* (1967). Care was taken not to damage the scales and the fins. Samples of the fish were preserved in 10% formalin solution for future reference.

**Characters used in the identification of the species**

1. **Morphometric measurements**
   
The measurements taken were aimed at comparing the body shape in different species. Morphometric characters defined in Leveque *et al.* (1990) were measured and recorded in centimeters to the nearest 0.01cm, and this was done using a pair of dividers, measuring board, meter rule and a rope.

   **Standard length:** The distance from the anterior part of the snout (with the jaw closed) to the base of the caudal fin.
   
   **Head length:** This was measured, with the mouth closed, from the tip of the snout to the posterior edge of the opercula bone.
   
   **Head width:** This was measured with gill covers closed
   
   **Eye diameter:** This was taken (using a pair of dividers and a ruler) as the length of the orbit

2. **Meristic counts**
   
   This included the fin ray counts, scale counts and the number of teeth in the upper and lower jaws of the fish.

   **Fin ray counts:** All rays of the paired fins (pectoral and pelvic) and the unpaired fins (dorsal, anal and caudal) were counted, including the smallest ones at the lower end of the fin base.

   **Scale counts:**
   
   i. **Lateral line scale counts:** This represents the number of pored scales in the lateral line. The count was taken from the scale in contact with the shoulder girdle to the structural caudal base, by moving the caudal fin from side to side
   
   ii. **Scales above lateral line:** These were counted from the origin of the dorsal fin, including the small scales and counting downward but not including the lateral line scale.
   
   iii. **Scales below lateral line:** These were counted upward from the origin of the anal fin (including the small scales).

3. **Qualitative characters**
   
   Observations were also made on the shape and colour of the fish, with particular attention given to the adipose fin.

A total of fifty five (55) fish samples were examined and identified and data were collected.

**Results**

Table 1 summarises the results of the morphological characteristics of *Hydrocynus forskalii* of Lake Kainji. Most of the fish species gotten were *Hydrocynus brevis* and *Hydrocynus forskalii* (as seen in Fig.1), no species of *Hydrocynus vittatus* (*lineatus*) was obtained throughout the period of study.
Figure 1: Species Composition of Hydrocynus Catches

- *Hydrocynus forskalii*: 94.54%
- *Hydrocynus brevis*: 5.46%
Table 1. Morphological characteristics of *Hydrocynus forskalii* of Lake Kainji compared with Leveque et al. (1990), Olaosebikan and Raji (1998) and Reed et al. (1967).

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<tr>
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<tbody>
<tr>
<td>Teeth</td>
<td>10 in the upper jaw, 8 in the lower jaw</td>
<td>Teeth large, canine like, separated by wide gaps</td>
<td>-</td>
<td>A single row in each jaw of large pointed teeth which are razor sharp on both edges, spaced well apart and can be seen even when mouth is closed</td>
</tr>
<tr>
<td>Scales</td>
<td>Marked with black lines</td>
<td>Marked</td>
<td>Dark longitudinal stripes along each row of scales</td>
<td></td>
</tr>
<tr>
<td>Adipose fin (colour)</td>
<td>Grey</td>
<td>Grey</td>
<td>Grey</td>
<td>Grey</td>
</tr>
<tr>
<td>Eye size</td>
<td>Less than 70% of interorbital space</td>
<td>-</td>
<td>Well developed adipose eyelid</td>
<td></td>
</tr>
<tr>
<td>Fish Colour</td>
<td>Silvery white</td>
<td>Silver plated</td>
<td>Grey or olive green on the back, sides are silvery, dark longitudinal stripes along each row of scales above the lateral line</td>
<td></td>
</tr>
<tr>
<td>Number of scale rows below lateral line</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Body profile</td>
<td>Long and slender</td>
<td>Slender profile</td>
<td>-</td>
<td>Long, slender</td>
</tr>
<tr>
<td>Caudal fin colour</td>
<td>Orange</td>
<td>Bright red</td>
<td>-</td>
<td>Bright red</td>
</tr>
<tr>
<td>Caudal fin shape</td>
<td>Forked</td>
<td>-</td>
<td>-</td>
<td>Deeply forked</td>
</tr>
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</table>

References
Blake, B. F (1976) Lake Kainji, Nigeria: A summary of the changes within The fish population since the impoundment of the Niger in 1968. Department of Zoology, University of Reading.


